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# Research excellence vs research impact?

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Albert Banal-Estanol

# Excellence vs “impact”

## Research excellence



Research of high  
“quality” and high-level  
(scientific) impact

## Research impact



Contributing to  
business, the  
economy and society

# The European Paradox

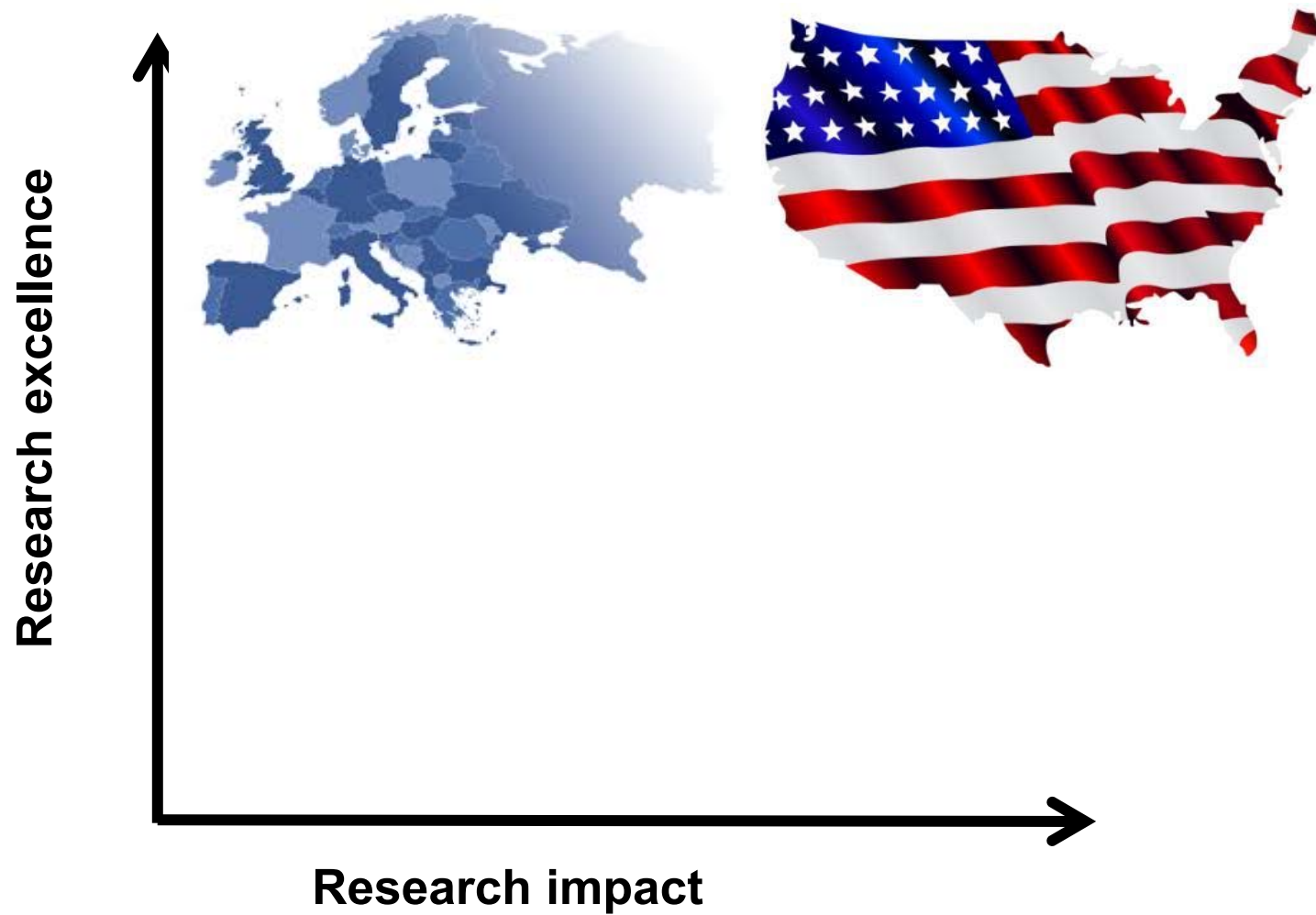
**Research excellence**



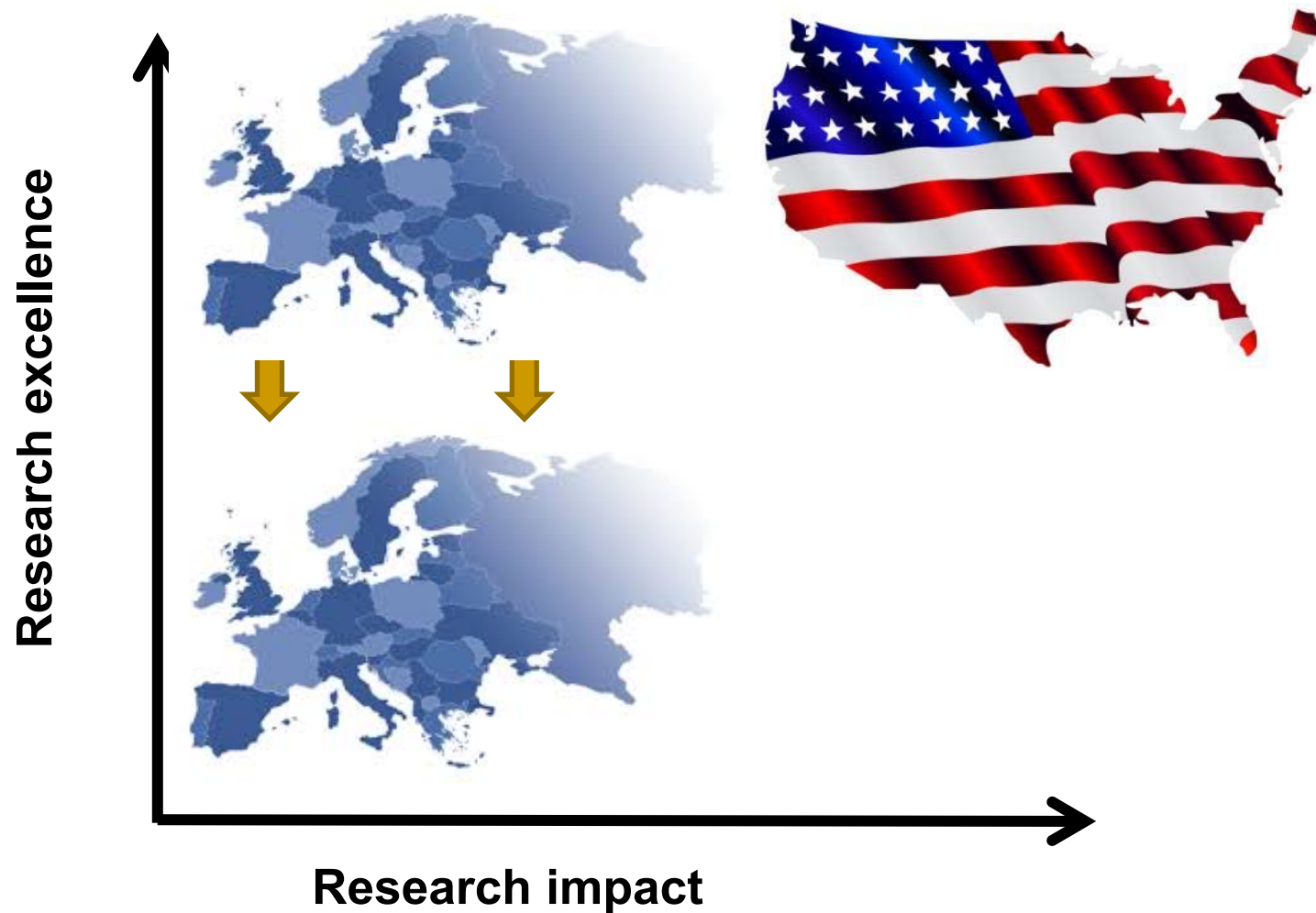
**Research impact**



# The European Paradox



Top left or... rather... bottom left?



# Climbing up and right



- Research excellence and impact simultaneously?
  - Are top researchers able/willing to collaborate with firms? Do they do it with the most research-intensive?
  - Would collaboration improve their research projects?
  - Do their careers suffer from industry collaboration?
  
- More generally:
  - What are the university-industry collaboration patterns?
  - What are the results of these collaborations?

# Excellence and impact



- Main UK government agency for engineering and the physical sciences:
  - More half of the overall research funding of the UK engineering departments
  - Research assessment exercises (REF) also use it as an input
  
- Mission statement (1993):
  - promote and support high quality basic, strategic and applied research in engineering and the physical sciences
  - placing special emphasis on meeting the needs of the users of its research outputs, thereby enhancing the UK's industrial competitiveness and quality of life
  
- Project partners:
  - Collaborating organisation who will have an integral role in the proposed projects
  - Around 35% of the EPSRC projects are collaborative, i.e. involve private firms

# A collaborative project in our database

**Prof. Sir Colin John Humphreys  
(University of Cambridge)**



**Field Electron and Ion (FEI)  
(US-based company)**



- Specialises in electron microscopy and analysis
- Prolific researcher of top uni; his research is considered basic
- World-leading company in production of electron microscopes
- Research-intensive firm, heavily oriented towards basic research



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# Is this the most common pattern?

- Do top academics collaborate with top firms, whereas less productive researchers collaborate with less productive firms?
- Or, do they collaborate because they have similar preferences?
- Do more prolific researchers get their most preferred choices?
- Matches occur because of individual or institutional features?
- Do less productive/more applied academics collaborate less?

Banal-Estanol, Macho-Stadler and Perez-Castrillo (Man Sci, 2018)

# Data

- Sample: 5,855 EPSRC projects
  - Matched with the academic calendar census of 40 major universities
- Proxies for “ability” of project's academics and firms:
  - (i) Count and (ii) "impact-factor-weighted" sum of publications
  - For the six years prior to the start of the project
- Proxies for type of research of each (“affinity”) :
  - Based on classification of research into (1) applied technology and (2) engineering and technological science (3) applied and targeted basic research and (4) basic scientific research
  - Level of “appliedness”:  $(1) + (2) / (1) + (2) + (3) + (4)$
- Other academic, firm and project characteristics

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# Results: matched pairs

- Positive assortative matching in terms of ability:
  - Top academics collaborate with top firms
  - Being in same quartile of ability increase matching by 20%
- Positive assortative matching in terms of type of research:
  - More applied academics collaborate with more applied firms
  - 33%(39%) more likely to be matched if both above(below) median
- Importance of research excellence:
  - Matching occurs at the top of the distribution in terms of ability but over the whole distribution in terms of affinity for type of research
  - High-ability academics collaborate with firms of more similar type
  - Institutional characteristics less important

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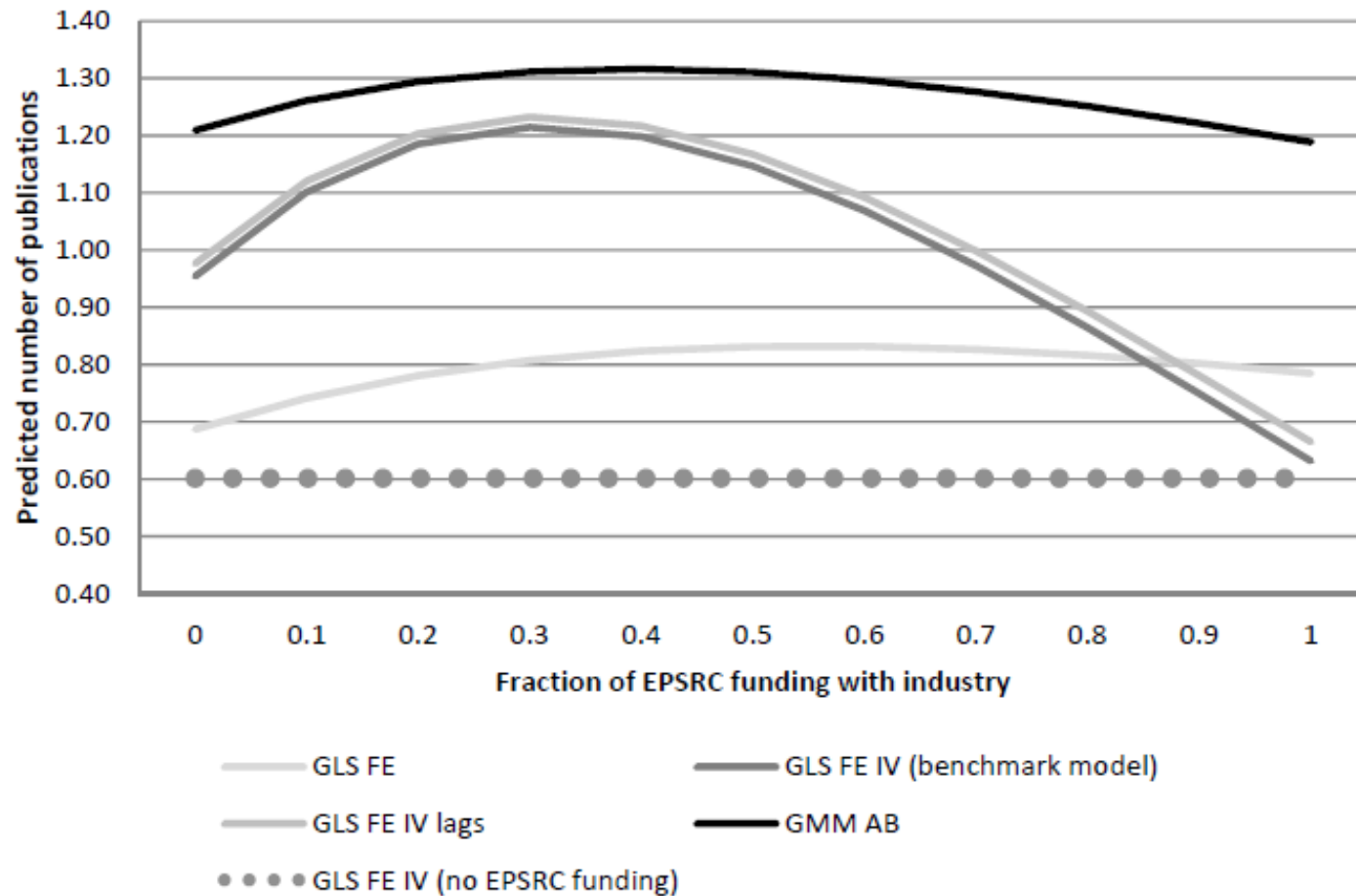
# Results: collaborate or not

- Ability:
  - Most able academics are those more likely to collaborate
  - Above the median in terms of ability are 9.1% more likely
- Type of research:
  - More applied than median 39.5% more likely to collaborate
- Institutional characteristics again less important:
  - Academics in larger and better-performing universities are neither more nor less likely to submit collaborative projects

# Is this the most common pattern?

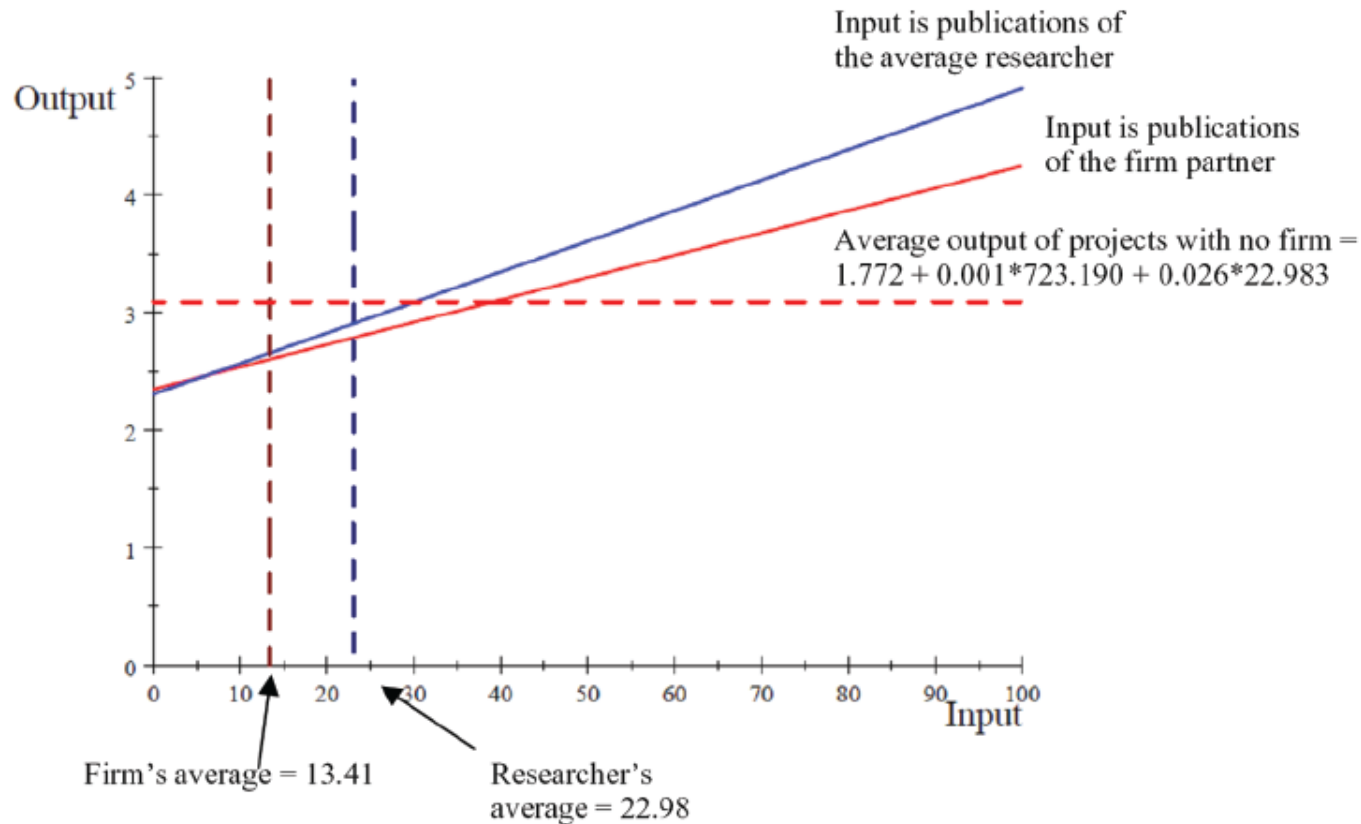
- Do top academics collaborate with top firms, whereas less productive ones collaborate with less productive firms? ✓
- Or, do they collaborate because they have similar preferences? ✓
- Do more prolific researchers get their most preferred choices? ✓
- Matches occur because of individual or institutional features? ✓
- Do less productive/more applied academics collaborate less? ✓ ✗

# Collaboration is good for the researcher...up to a point



Banal-Estanol, Jofre-Bonet and Lawson (RP, 2015)

# Should we also evaluate the firms?



Banal-Estanol, Macho-Stadler and Perez-Castrillo (EDQ, 2014)

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# Who is more likely to get funded?

- Positive and significant:
  - Academic ability (count, citations or journal-impact factor sum of publications)
  - Academic rank
  - Affiliation with a university of the Russell (elite) group
  - Size of the team (concave)
  - **Presence of a company as a project partner**
- Negative and significant:
  - Appliedness (fraction of publications in first category of PB classification)
  - Academic age
- Insignificant:
  - Previous experience (number of past EPSRC applications)

Banal-Estanol, Macho-Stadler and Perez-Castrillo (Rev Eco, 2014)

Banal-Estanol, Macho-Stadler and Perez-Castrillo (WP, 2018)



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# Concluding remarks

- Research excellence and impact simultaneously:
  - Top researchers more likely to collaborate with firms, and with the most research-intensive firms
  - Academic career does not suffer from industry collaboration, up to a point
  - Collaboration makes projects better, as long as the project partners are also research intensive
  
- Next step:
  - “Impact” from excellent research worth 25% in next REF